What is claimed:

1. A microfluidic device comprising a section of solid material with a microchannel having an entrance and exit port for the transportation of fluids in and out of the microchannel wherein the microchannel contains spacially separated defined regions of specific binding pair member immobilized on a porous polymer, beads or on microstructures fabricated in the microchannel.

2. The microfluidic device of claim 1 wherein the device is fabricated from silicon, glass, silicon dioxide, plastic or ceramics.

3. The microfluidic device of claim 1 wherein the separated defined regions are porous polymer with specific binding pair member bound to the porous polymer.

4. The microfluidic device of claim 1 wherein the separated defined regions have beads with specific binding pair member bound to the bead.

5. The microfluidic device of claim 1 wherein the defined regions are with immobilized binding pair members are formed by introducing hydrogels in the microchannels.

6. The defined region of claim 5 wherein the binding pair members are selectively dispensed on spatially separated portions of hydrogel.

7. The defined region of claim 5 wherein the hydrogels in the microchannels are patterned by means including photolithography.

8. The microfluidic device of claim 1 wherein the separated defined regions have microstructures fabricated into the microchannel and the microstructures have specific binding pair member bound thereto.

9. The microfluidic device of claim 1 wherein the binding pair members from a group consisting of DNA, RNA, polypeptides, nucleic acids, and antibody/antigens.

10. The microfluidic device of claim 1 wherein the specific binding member is a DNA or RNA probe.

11. The microfluidic device of claim 1 wherein the specific binding member is DNA.

12. The microfluidic device of claim 1, further comprising a fluid propelling component that is operatively associated with the microchannels.

13. The fluid propelling component in claim 12 is a pressurized gas, vacuum, electrical field, magnetic field or centrifugal force.

14. The microfluidic device of claim 1, comprising a detector component that is operatively associated with the microchannels.

15. The microfluidic device of claim 14 wherein the detector is an optical, electrical or electrochemical detector.

16. A method of detecting a specific binding member in a test sample comprising:

a. providing the microfluidic device of claim 1;

b. flowing the test sample through the microchannel to form a binding pair;

c. detecting the binding pair.

17. The method of claim 16 wherein the flow of the test sample is recirculated in the microchannel.

18. The method of claim 16 wherein the flow rate of the test sample is adjusted by a fluid propelling component operatively associated with the microchannel.

19. The method of claim 16 wherein the migration speed of a charged sample is further modified through applying a modular electrical field in or against the direction of flow.

20. The method of claim 16 wherein the charged test sample is attracted or repelled at the spatially defined region by the application of electrical field in the direction perpendicular to the flow direction.